CLAIMS:

1. A phantom for use in inspection of radiation imaging system which inspection is carried out by evaluating a radiation image obtained by imaging said phantom by using said radiation imaging system as to at least one image quality evaluation item, said phantom comprising:

a base plate;

a first member disposed on said base plate and having a first image quality evaluating pattern formed thereon to be used for visual evaluation as to a predetermined image quality evaluation item; and

a second member disposed on said base plate and having a second image quality evaluating pattern formed thereon to be used for quantitative evaluation as to said predetermined image quality evaluation item.

2. A phantom according to claim 1, wherein said first image quality evaluating pattern includes at least one of a wire mesh pattern formed of plural kinds of wire meshes having different wire pitches, a bar pattern and a radial pattern in the case where said predetermined image quality evaluation item is sharpness of said radiation image; and

said second image quality evaluating pattern includes at least one of a edge pattern, a slit pattern and a rectangular wave pattern in the case where said predetermined image quality evaluation item is the sharpness of said radiation image.

3. A phantom according to claim 1, wherein said first image quality evaluating pattern includes a Burgere's phantom

constituted of a plurality of members in which either one of size and thickness is different between said plurality of members in the case where said predetermined image quality evaluation item is contrast resolution of said radiation image.

4. A phantom according to claim 1, wherein an empty region, which is used for quantitatively evaluating an S/N ratio of said radiation image, is formed in said base plate.

5. A phantom according to claim 1, wherein said second image quality evaluating pattern includes a scale pattern in the case where said predetermined image quality evaluation item is contraction ratio of said radiation image.

6. A phantom according to claim 1, wherein said first and second image quality evaluating patterns include step-like patterns formed of a plurality of metal plates having thicknesses different from each other in the case where said predetermined image quality evaluation item is one of linearity and dynamic range of said radiation image.

7. A phantom according to claim 1, wherein:

said base plate constitutes a part of a case for housing said first and second members; and

said phantom further comprises a lid for covering said case.

8. A phantom for use in inspection of radiation imaging system which inspection is carried out by evaluating a radiation image obtained by imaging said phantom by using said radiation imaging system as to at least one image quality

evaluation item, said phantom comprising:

a base plate;

at least one member disposed on said base plate and having an image quality evaluating pattern formed thereon to be used for a predetermined image quality evaluation item; and

a plurality of markers, respectively disposed at a plurality of positions different from each other on said base plate, for use of detecting a position of said image quality evaluating pattern in said radiation image.

9. A phantom according to claim 8, wherein said plurality of markers have radiation transmittances different from that in other region of said phantom.

10. A phantom according to claim 8, wherein said plurality of markers have shapes different from that of said image quality evaluating pattern.

11. A phantom according to claim 8, wherein said plurality of markers includes at least three markers.

12. A medical image processing apparatus for evaluating image quality of a radiation image obtained by using a radiation imaging system which performs radiation imaging to record radiation image information on a recording medium, reads out the radiation image information from the recording medium to generate image data, and performs a predetermined image processing for the image data to display or output a radiation image, thereby inspecting said radiation imaging system, said medical image processing apparatus comprising:

image processing means for performing image processing

on input image data;

measuring means for performing, when image data representing a radiation image obtained by imaging a phantom having a plurality of image quality evaluating patterns as to a predetermined image quality evaluation item is inputted, measurement with respect to the input image data as to said predetermined image quality evaluation item;

inputting means to be used for inputting inspection result as to said predetermined image quality evaluation item obtained by visually observing the displayed or outputted radiation image; and

determination means for determining the image quality of said radiation image on the basis of measurement result obtained by said measuring means and the inspection result inputted by using said inputting means.

13. A medical image processing apparatus according to claim 12, further comprising:

position detecting means for detecting a position of said phantom in said radiation image on the basis of the input image data.

14. A medical image processing apparatus according to claim 13, wherein said position detecting means detects the position of said phantom in said radiation image by detecting images of a plurality of markers respectively disposed at positions different from each other in said phantom.

15. A medical image processing apparatus according to claim 14, wherein said plurality of markers include at least three

markers.

16. A medical image processing apparatus according to claim 12, further comprising control means for controlling, when image data representing a radiation image obtained by radiation imaging of a phantom having an image quality evaluating pattern to be used for visual evaluation and an image quality evaluating pattern to be used for quantitative evaluation as to a predetermined image quality evaluation item is inputted, to display determination result based on the quantitative evaluation as to said predetermined image quality evaluation item together with said radiation image.

17. A medical image processing apparatus according to claim 12, further comprising control means for controlling to display together with said radiation image at least one of imaging condition when said radiation image has been imaged, image reading condition when said radiation image information has been read out from said recording medium, image processing condition when the input image data has been subjected to the image processing by said image processing means and display condition when said radiation image is displayed.

18. A medical image processing apparatus according to claim 12, further comprising recoding means for recording the measurement result obtained by said measuring means and the inspection result inputted by using said inputting means.

19. A medical image processing apparatus according to claim 12, further comprising control means for controlling, when said determination means has determined that abnormality of

the image quality exists in said radiation image, to notify a maintenance center of existence of the abnormality of the image quality.

20. A medical image processing apparatus for evaluating image quality of a radiation image obtained by using a radiation imaging system, thereby performing inspection of said radiation imaging system, said medical image processing apparatus comprising:

position detecting means for detecting, when image data representing a radiation image obtained by imaging a phantom having an image quality evaluating pattern as to at least one image quality evaluation item and a plurality of markers respectively disposed at a plurality of positions different from each other by using said radiation imaging system is inputted, a position of said phantom in said radiation image by using said plurality of markers;

comparison and calculating means for comparing the position of said phantom detected by said position detecting means with a reference position of said phantom in said radiation image, and calculating an amount of difference in a linear direction and a rotational direction;

search area changing means for changing a search area, which is a region within said radiation image to be measured as to a predetermined image quality evaluation item, on the basis of the amount of difference calculated by said comparison and calculating means;

physical amount calculating means for performing

measurement as to said predetermined image quality evaluation item within the search area changed by said search area changing means, and calculating a physical amount representing characteristic of said radiation image;

determination criterion changing means for changing a determination criterion to be used for determining the image quality of said radiation image, on the basis of the amount of difference calculated by said comparison and calculating means; and

determination means for determining the image quality of said radiation image by using said physical amount calculated by said physical amount calculating means, on the basis of the determination criterion changed by said determination criterion changing means.

21. A medical image processing apparatus according to claim 20, further comprising control means for controlling, when said determination means has determined that abnormality of the image quality exists in said radiation image, to notify a maintenance center of existence of the abnormality.

22. A medical image processing apparatus for evaluating image quality of a radiation image obtained by using a radiation imaging system, thereby performing inspection of said radiation imaging system, said medical image processing apparatus comprising:

position detecting means for detecting, when image data representing a radiation image obtained by imaging a phantom having an image quality evaluating pattern as to at least

one image quality evaluation item and a plurality of markers respectively disposed at a plurality of positions different from each other by using said radiation imaging system is inputted, a position of said phantom in said radiation image by using said plurality of markers;

comparison and calculating means for comparing the position of said phantom detected by said position detecting means with a reference position of said phantom in said radiation image, and calculating an amount of difference in a linear direction and a rotational direction;

image correcting means for correcting the position of said phantom in said radiation image so that the amount of difference calculated by said comparison and calculating means is reduced;

physical amount calculating means for performing measurement with respect to an image of said phantom, of which position is corrected by said image correcting means, as to a predetermined image quality evaluation item, and calculating a physical amount representing characteristic of said radiation image; and

determination means for determining the image quality of said radiation image on the basis of the physical amount calculated by said physical amount calculating means.

23. A medical image processing apparatus according to claim 22, further comprising control means for controlling, when said determination means has determined that abnormality of the image quality exists in said radiation image, to notify

a maintenance center of existence of the abnormality of the image.

24. A method of evaluating image quality of a radiation image obtained by using a radiation imaging system, thereby inspecting said radiation imaging system, said method comprising the steps of:

(a) inputting image data representing a radiation image obtained by radiation imaging of a phantom having a plurality of image quality evaluating patterns as to image quality evaluation items including at least measurement of linearity, sharpness and contraction ratio;

(b) detecting a position of said phantom in said radiation image on the basis of the image data inputted at step (a);

(c) performing measurement as to the image quality evaluation items including measurement of at least linearity, sharpness and contraction ratio on the image of said phantom on the basis of the image data inputted at step (a); and

(d) determining the image quality of said radiation image on the basis of measurement result obtained at step (c).

25. A method according to claim 24, wherein step (d) includes determining the image quality by comparing the measurement result obtained at step (c) with past measurement result.

26. A method according to claim 24, further comprising the step of notifying, when it is determined at step (d) that abnormality of the image quality exists in said radiation image, a maintenance center of existence of the abnormality of the image quality.

27. A method of evaluating image quality of a radiation image obtained by using a radiation imaging system for performing radiation imaging to record radiation image information on a recording medium, reading out the radiation image information from the recording medium to generate image data, subjecting the image data to a predetermined image processing to display or output the radiation image, thereby inspecting said radiation imaging system, said method comprising the steps of:

(a) inputting an image data representing a radiation image obtained by radiation imaging of a phantom having an image quality evaluating pattern to be used for visual evaluation and an image quality evaluating pattern to be used for quantitative evaluation as to a predetermined image quality evaluation item;

(b) performing quantitative measurement with respect to the image data inputted at step (a) as to said predetermined image quality evaluation item;

(c) displaying or outputting the radiation image on the basis of the image data inputted at step (a) and visually observing the displayed or outputted radiation image to perform inspection as to said predetermined image quality evaluation item; and

(d) determining the image quality of said radiation image on the basis of measurement result obtained at step (b) and inspection result obtained at step (c).

28. A method according to claim 27, wherein step (c) includes

displaying result of quantitative evaluation based on the measurement result obtained at step (b) together with said radiation image.

29. A method according to claim 27, further comprising the step of displaying together with said radiation image at least one of imaging condition when said radiation imaging has been carried out, image reading condition when the radiation image information has been read out from said recording medium, image processing condition when the image processing has been made on the input image data and display condition when said radiation image is displayed.

30. A method according to claim 27, further comprising the step of notifying, when it is determined at step (d) that abnormality of the image quality exists in said radiation image, a maintenance center of existence of the abnormality of the image quality.

31. A method of evaluating image quality of a radiation image obtained by using a radiation imaging system, thereby inspecting said radiation imaging system, said method comprising the steps of:

(a) inputting an image data representing a radiation image obtained by radiation imaging of a phantom having an image quality evaluating pattern as to at least one image quality evaluation item and a plurality of markers respectively disposed at a plurality of positions different from each other;

(b) detecting a position of said phantom in said radiation

image by using said plurality of markers on the basis of the image data inputted at step (a);

(c) comparing the position of said phantom detected at step (b) with a reference position of said phantom in said radiation image, and calculating an amount of difference in a linear direction and a rotational direction;

(d) changing a search area, which is a region within said radiation image to be measured as to a predetermined image quality evaluation item, on the basis of the amount of difference calculated at step (c);

(e) performing measurement in the search area changed at step (d) as to said image quality evaluation items, and calculating a physical amount representing characteristic of said radiation image;

(f) changing a determination criterion to be used for evaluating the image quality of said radiation image on the basis of the amount of difference calculated at step (c); and

(g) evaluating the image quality of said radiation image by using the physical amount calculated at step (e) on the basis of the determination criterion changed at step (f).

32. A method according to claim 31, further comprising the step of notifying, when it is determined at step (g) that abnormality of the image quality exists in said radiation image, a maintenance center of existence of the abnormality of the image quality.

33. A method of evaluating image quality of a radiation image

obtained by using a radiation imaging system, thereby inspecting said radiation imaging system, said method comprising the steps of:

(a) inputting an image data representing a radiation image obtained by radiation imaging of a phantom having an image quality evaluating pattern as to at least one image quality evaluation item and a plurality of markers respectively disposed at a plurality of positions different from each other;

(b) detecting a position of said phantom in said radiation image by using said plurality of markers on the basis of the image data inputted at step (a);

(c) comparing the position of said phantom detected at step (b) with a reference position of said phantom in said radiation image, and calculating an amount of difference in a linear direction and a rotational direction;

(d) correcting the position of said phantom in said radiation image so that the amount of difference calculated at step (c) is reduced;

(e) performing measurement with respect to the image of said phantom, of which position has been corrected at step (d), as to a predetermined image quality evaluation item, and calculating a physical amount representing characteristic of said radiation image; and

(f) determining the image quality of said radiation image on the basis of the physical amount calculated at step (e).

34. A method according to claim 33, further comprising the

step of notifying, when it is determined at step (f) that abnormality of the image quality exists in said radiation image, a maintenance center of existence of the abnormality of the image quality.